Eliminate supply chain risks with a custom ASIC from ShortLink

Are you spending a lot of time managing your supply chain, desperately trying to purchase expensive components on the spot market? Have you seen price increases of critical components over the last few years? Transitioning to ASIC technology can reduce risks, maintenance and cost of your product and increase your influence over the supply chain. This excerpt from the ShortLink blog discusses how an ASIC – your very own semiconductor – can help you take control over your supply chain.

A chain is only as strong as its weakest link.

This holds true for your supply chain as well. This fact has been painfully experienced by purchasing departments and engineers all over the world for the past few years. The semiconductor shortage has cost companies hundreds of billions, and has put the spotlight on how vulnerable and complex the supply chain for electronics is.

Typical circuit board

Imagine a typical circuit board with 60 BOM rows. Each component type becomes a link in the chain. If one of those links would break – a component that can't be purchased – production will halt.

Finding replacements becomes more difficult as the complexity of the part increases. Most PCB assemblies have a couple of critical components that are impossible to replace without a significant redesign in both hardware and software.

Circuit board with an ASIC

A typical custom ASIC is designed to remove many discrete components. It is not uncommon for an ASIC to replace hundreds of discrete components. If we can remove 40 BOM rows by using an ASIC we replace 40 separate links with a single one. This removes 39 points of failure, a huge improvement.

When deciding which functions to place in an ASIC, critical components are often prioritized in order to make the end product as resilient as possible. In many cases, the resulting design consists only of an ASIC and a couple of passive components.

This means that you have not only removed 39 arbitrary points of failure – you have taken care to remove the most critical ones.

Supply chain risks

There are many reasons as for why a component becomes unavailable. The three most common ones are supply issues, end of life and new component revisions.

Let's see how transitioning to an ASIC gives you control. New component revision? Not unless you decide to update your ASIC. End of Life? You decide when to kill your own device. When the manufacturing process is ultimately retired, you can order a sufficient quantity of ASIC wafers and place in storage for your future needs.

You take control over the semiconductor supply chain with your own ASIC. You can choose subcontractors, adapt to changes and employ the risk mitigations that fit your organization needs.

Read the full article on shortlink.se/blog

ShortLink supply chain

For the last 25 years, ShortLink has gradually mastered the semiconductor supply chain. We consider the supply chain from the very start of every ASIC development project. We work with foundries and subcontractors all over the world and can offer production in Europe, USA and different parts of Asia depending on customer needs.

We can help you control your supply chain in order to mitigate your supply chain risk. We also have discrete hardware engineers that can help you with board redesigns to handle component shortages and find alternative components

Take control over your supply chain with ShortLink

An ASIC allows you to greatly simplify and take control over your supply chain. Using a custom ASIC gives you a big advantage compared to your competitors that solely rely on commercial parts. We can help you eliminate a lot of future headaches by removing suppliers and dependencies with a single ASIC. We also have discrete hardware engineers that can help you with board redesigns to handle component shortages and find alternative components.

Your solution might be an ASIC – we can help you find out

ShortLink is a Swedish competence center with more than 25 years of experience. We focus on developing leading edge low-power electronics for wireless communication and portable products.

We develop custom ASICs, embedded hardware, software, antennas and more.

The exponential cost of fixing EMC problems

EMC compliance is a crucial but often neglected part of the development of electronics. Approaching the EMC aspect of a product early in the design phase is the best way of mitigating the risk associated with EMC testing. Fixing EMC problems close to production is incredibly costly and risky.

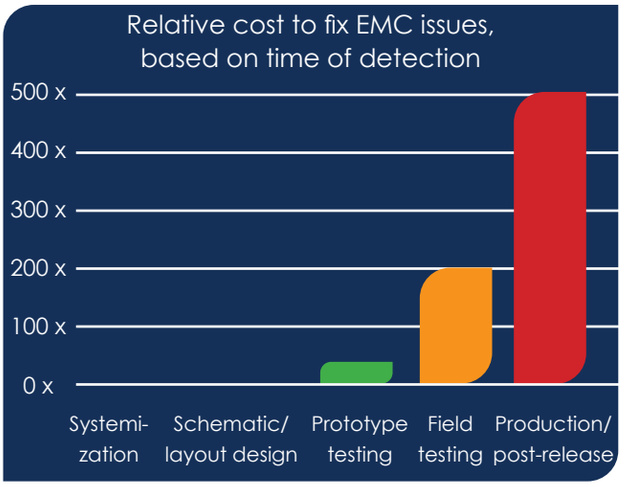
Managing EMC by ignoring it

Many companies have a narrow view of the scope of EMC. It feels uncomfortable, a bit random, and unpredictable. But there is a clear acceptance criterion: pass the applicable standards (IEC / FCC) at an EMC compliance testing facility.

Without expertise in the field of EMC, the easy way out is to wait until the product is complete, cross your fingers and perform compliance testing on a production unit. If it works: great! If it doesn't: disaster. This is a direct application of the ostrich algorithm, which is bad risk management practice. The typical rate of first-pass success is less than 50 %.

Worst case scenario – fixing in production

Non-compliance at the prototype stage is fine, suitable solutions can be tested and the design adapted to find low-cost solutions. Discovering it on a production unit puts **immense pressure both on design mitigation** and scheduling: EMC compliance can suddenly become your critical path to sales start.



Why is the impact so severe?

The cost of fixing EMC issues on a "finished" design is by far the most expensive and risky way. Depending on the circumstances it can be hundreds or even thousands of times more costly than fixing the problems earlier. If series production has started, the sky is the limit.

What could have been a simple software fix or better planning of the circuit placement can now become expensive ferrite shields, custom metal structures, or a large software rewrite. In the worst case, large reworks of the system can be needed adding months to the time plan, requiring extensive re-testing and re-qualification and the scrapping of any produced units.

Don't be an ostrich. You'll thank yourself later if you embrace EMC early on.

What should you do?

Looking at the impact graph, the solution is simple: Consider EMC aspects early in your design. There are many ways to achieve this, the two easiest ones are:

Get an early review of the design

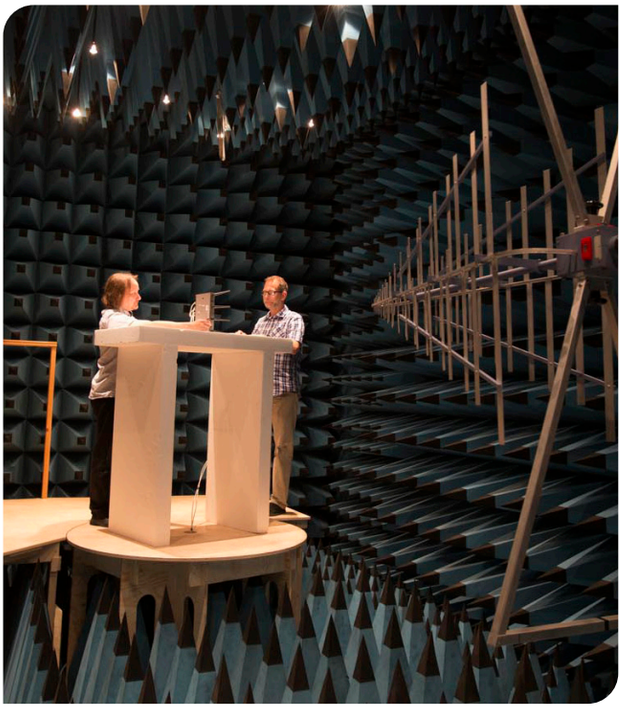
We offer EMC reviews of electronic designs at any stage of design completion. We can help you identify possible problem areas and suitable mitigation techniques to reduce the risk of EMC problems.

Test as early as possible

Perform EMC testing as soon as possible, preferably as a part of your development process. Even a reduced test set can give you insights into problem areas to reduce the largest risks on your first prototypes. We can help you achieve the level of testing that is right during your entire development project, up to final compliance testing.

Take control of EMC with ShortLink Compliance

The next best thing to having your own EMC lab is to have a compliance testing partner during your development project. We offer this service along with many other testing services via our sister company ShortLink Compliance. We have extensive facilities, high-performance measurement equipment, and senior EMC design and measurement engineers.



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Sub-GHz vs 2.4 GHz communication

A question debated in schoolyards for years: Who would win in a fight – Sub-GHz or 2.4 GHz? There is no clear winner: both technologies have their merit. Many products that use the 2.4 GHz band would benefit from operating at a lower frequency, such as the open ISM bands at 433, 868 or 915 MHz.

Sub-GHz physics and benefits

• A different radio frequency – Sub-GHz frequencies are inherently better suited for many applications where low data rates (less than 1–10 Mbps) are used. The advantages come directly from physical laws.

• Long range – Achieve long range (>1 km) communication without relying on cellular technologies

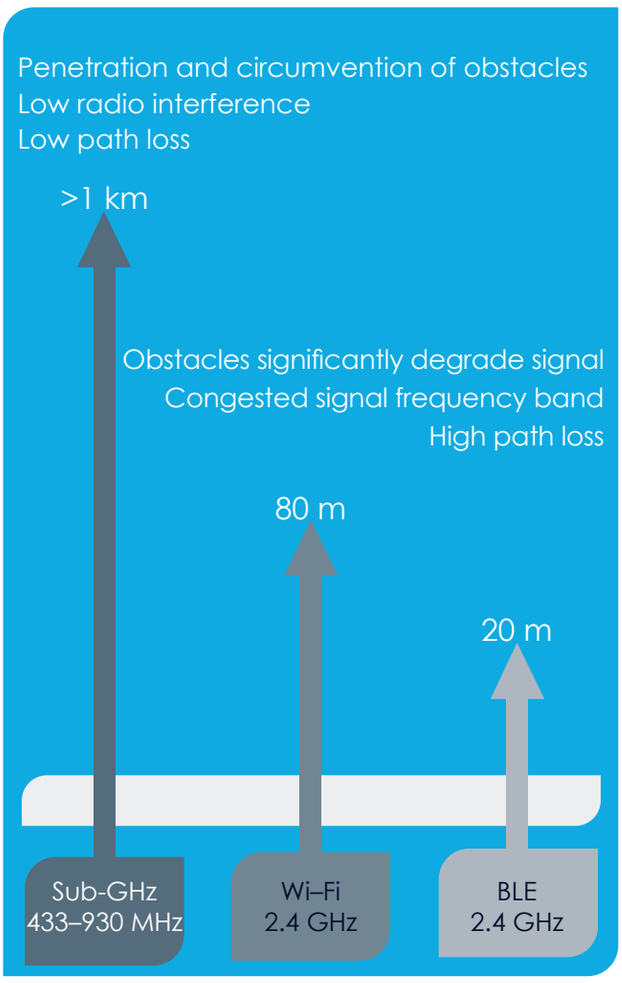
• Indoor communication – Penetration of walls and ceilings allows reliable indoor communication without relying on tricks such as mesh networks and repeaters

• Outdoor communication – Less attenuation due to atmosphere, foliage and non-reliance on RF reflection results in reliable extreme long range outdoor communication

• Better battery life – Lower frequencies result in lower power consumption allowing longer battery life and/or a smaller battery

The advantages come directly from physical laws

Read the full article on shortlink.se/blog



Sub-GHz for smart metering

Sub-GHz allows both indoor and outdoor communication over a large area. One example of an application that greatly benefits from Sub-GHz technology is smart metering.

Reliable extreme long range point-to-point outdoor communication due to the following factors:

• Low attenuation due to atmosphere, foliage and non-reliance on RF reflexes compared to higher frequencies

• Better diffraction properties, signal bends better at house corners

• Path loss is lower for lower frequencies

• Less congested band than 2.4 and 5 GHz

• Low duty cycle results in reduced disturbances

Typical outdoor application: smart metering (power, gas, water):

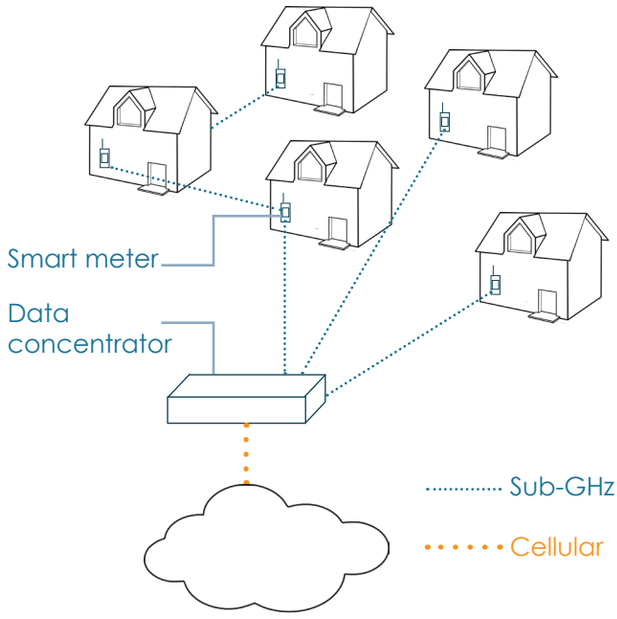
• Each house in a neighbourhood has a smart meter with a Sub-GHz radio transceiver

• Each meter communicates directly to a data concentrator

• Each data concentrator can handle a large area even if the meters are placed in suboptimal positions (e.g. basements)

25 years of Sub-GHz at ShortLink

ShortLink has over 25 years of experience of developing electronics operating in the Sub-GHz band. Our experience includes discrete hardware design using commercially available circuits, antenna design, protocol design and custom RF ASIC design. We have a complete Mixed-Signal Sub-GHz transceiver IP block allowing us to efficiently create a custom ASIC with integrated Sub-GHz communication.



Your product might benefit from Sub GHz Tech – we can help you find out

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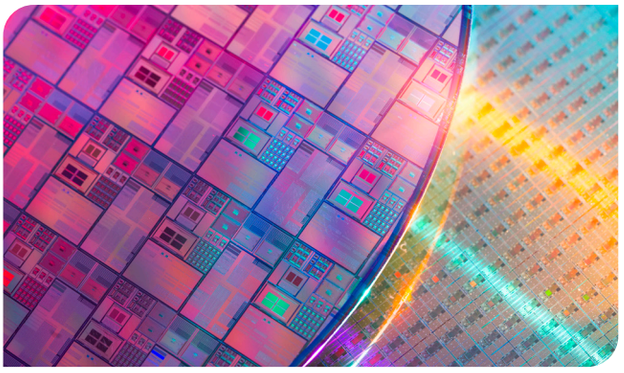
Swedish ASIC and electronic design 25 years of global impact

Mixed-Signal, RF ASIC and FPGA design

We have more than 25 years of ASIC development experience and a large catalogue of IP to help our customers develop the optimal solution in an efficient manner. We have a complete workflow for turnkey ASIC from specification to tape out and supply chain management for mass production.

Our expertise, projects and IP blocks span a variety of technologies and semiconductor foundry companies from deep sub-micron CMOS technologies to high voltage (>400 V) technology nodes.

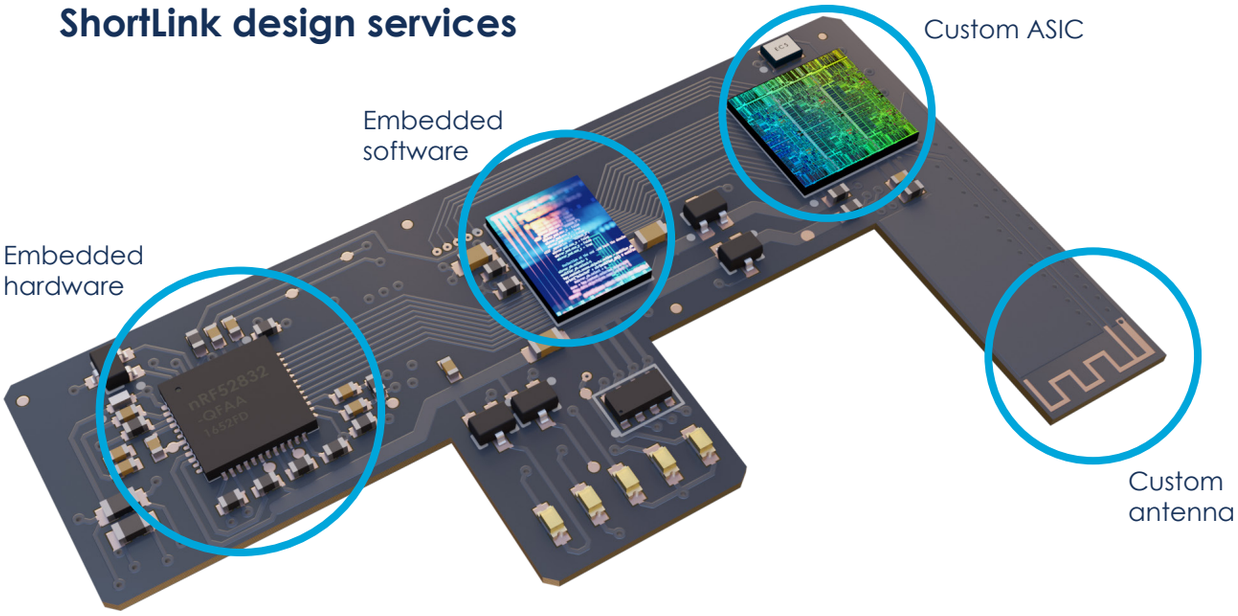
We are experienced in porting design between process nodes and foundries – an invaluable skill to reduce risk and cost during development while maintaining flexibility.



A custom IC design is no longer reserved for the large corporations

Thanks to modern tools, IP libraries and modern process technologies smaller companies can achieve a positive return of investment earlier than ever before.
The up-front cost of a custom ASIC is no longer the big hurdle it has previously been.

ShortLink design services



Embedded hardware and software design

With more than 25 years experience of advanced electronics development, we can offer a complete service for electronics design at PCB level with embedded software design. We produce an optimized design with circuit diagrams and layouts. We also carry out custom antenna design as well as EMC/Radio testing in our own test facility.

Whether you need assistance in developing prototypes or all the way to production adaptation and serial production, you can expect a solution that does exactly what you need – and on-time delivery.

We often design portable electronics platforms with high demands for low power consumption. These are often miniaturized systems that last for a long time on a single small battery.

Our speciality: wireless Internet of Things-products

Sometimes this means designing custom RF circuits and small custom built-in antennas. Other times the suitable solution is a standard chip and antenna. Our large competence span means that you will get the correct tradeoff for your application and constraints.